SMARTSHARE SYSTEMS

# SmartShare StraightShaper

# User Manual

## 300, 1000 and 5000 Series

## Firmware: 1.20

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## Table of Contents

1. Installation Guide ..... 6
1.1 Connect the StraightShaper to the network ..... 6
1.2 Turn on the StraightShaper ..... 6
1.3 Optional: Using the Web GUI to configure the connection manually ..... 6
2. The StraightShaper WAN Optimization System ..... 6
2.1 User Load Balancing™ ..... 6
2.1.1 User Identification ..... 7
2.1.2 Excess Users ..... 7
2.2 Download Optimizer™ and Upload Optimizer™ ..... 7
2.3 Dynamic Quality of Service™ ..... 7
2.4 Extra Shaping of Users with Many Flows (Optional) ..... 8
2.5 Flow Manager™ ..... 8
3. Status page ..... 8
3.1 System ..... 8
3.2 System Management ..... 8
3.3 Health Monitor™ ..... 8
3.4 Anti Terror Logger (firmware option) ..... 9
3.4.1 Log Servers ..... 9
3.4.2 SNMP Agents ..... 9
3.4.3 Buffer Usage ..... 9
3.4.4 Flows Logged ..... 9
3.5 WAN ..... 9
3.6 LAN ..... 9
3.7 Ext1 (optionally Ext1 – DMZ LAN) ..... 9
3.8 Ext2 (optionally Ext2 – DMZ WAN) ..... 9
3.9 Bandwidth Optimizer ..... 9
3.9.1 Download and Upload Rates ..... 9
3.9.2 Peak Download and Upload Rates ..... 10
3.9.3 Download and Upload Optimizer Status ..... 10
3.9.4 Download and Upload Available per User ..... 10
3.9.5 Active Users ..... 10
3.9.6 Download and Upload Optimizer Active Time ..... 10
3.9.7 Downloaded and Uploaded ..... 10
3.10 Flow Manager ..... 10
3.10.1 Flows ..... 10
3.10.2 Flow Rate ..... 10
3.10.3 Flows Processed ..... 10
3.11 User Manager ..... 11
3.11.1 User Capacity ..... 11
3.11.2 Managed Users ..... 11
3.11.3 Normal Users ..... 11
3.11.4 Aging Users ..... 11
3.11.5 New Users ..... 11
3.11.6 Peak Users ..... 11
3.11.7 Required Minimum User Capacity ..... 11
4. Connection configuration page ..... 11
4.1 IP Address ..... 11
4.1.1 DHCP Assigned ..... 11
4.1.2 Static Configuration ..... 12
4.2 Management VLAN (optional) ..... 12
4.3 Connection Speed ..... 12
4.3.1 Automatic Test ..... 12
4.3.2 Static Configuration ..... 12
4.4 Network Name ..... 13
5. ATL (Anti Terror Logging) configuration page (firmware option) ..... 13

5.1 Log File Storage ..... 13
5.2 Local Network SNMP Agents ..... 13
5.2.1 ATL Compatibility Requirements for the Local Network Equipment ..... 13
6. Advanced configuration page ..... 13
6.1 Remote Management ..... 13
6.2 Special Features ..... 14
6.2.1 VoIP Extra Priority ..... 14
6.3 System Time ..... 14
6.3.1 Time Zone ..... 14
6.3.2 Preferred NTP Server ..... 14
6.4 Provisioning ..... 14
6.5 Remote Logging ..... 14
6.5.1 SYSLOG ..... 14
6.5.2 Email ..... 14
6.6 System Information ..... 14
6.7 Extension Ports ..... 15
6.8 Fallback for Equipment without Auto Negotiation ..... 15
6.9 DHCP Server Detector ..... 15
6.10 Extra Shaping of Users with Many Flows ..... 15
6.11 User Groups ..... 15
6.12 Network Topology ..... 16
7. Detailed Status page ..... 16
8. Charts page ..... 17
8.1 Manipulating the Charts ..... 17
8.2 User Bandwidth Overview ..... 17
8.3 Connection Bandwidth Overview ..... 17
8.4 Flows Overview ..... 18
8.5 User Overview ..... 18
9. Top Users page ..... 18
9.1 Manipulating the Pie Charts ..... 18
10. Log page ..... 18
11. Save page ..... 18
11.1 Saved, Running and New Configuration ..... 18
11.2 Modifying the Configuration ..... 19
12. System page ..... 19
12.1 Download Firmware ..... 19
12.2 Install Activation Code ..... 19
12.3 Trial Mode ..... 19
12.4 Set System Date and Time ..... 20
12.5 Download Configuration to PC ..... 20
12.6 Upload Configuration from PC ..... 20
12.7 Restore Factory Defaults ..... 20
12.8 Reboot System ..... 20
13. Managers configuration page ..... 20
14. Logout page ..... 20
15. Using the Serial Port ..... 20
16. Using the Ext2 Port for Management ..... 21
17. Using the Ext1/Ext2 Ports for a DMZ Segment ..... 21
18. Security Considerations ..... 21
18.1 Physical Access ..... 21
18.2 Password Protection ..... 21
18.3 SNMP Community ..... 22
18.4 Protecting Local Users from Each Other ..... 22
19. Usage Information sent to SmartShare Systems ..... 22
19.1 Bandwidth Usage ..... 22
19.2 Information Sent ..... 22

19.3 Privacy Considerations ..... 22
20. Troubleshooting and FAQ ..... 23
21. LED Indicators ..... 23
22. Power Consumption ..... 23
23. Environmental Requirements ..... 24
24. Compliance Statement ..... 24
24.1 Model Type Labels ..... 24
25. Glossary ..... 24
26. Licensing Information ..... 25
26.1 END USER LICENSE AGREEMENT ..... 25
26.2 Third Party Software Components ..... 27
26.2.1 Acknowledgements for third party software components ..... 27
26.2.2 Open Source Software Components ..... 27
27. Safety Instructions ..... 27
27.1 Warning ..... 28
27.2 Product Disposal ..... 28

# 1. Installation Guide

### 1.1 *Connect the StraightShaper to the network*

Disconnect the Ethernet cable between the internet router's LAN port and the local network switch.

Connect the internet router's LAN port to the WAN port on the StraightShaper, using a straight Ethernet patch cable.

Connect the LAN port on the StraightShaper to any port on the local network switch (preferably use the port where the cable to the internet router was previously disconnected), using a straight Ethernet patch cable.

### 1.2 *Turn on the StraightShaper*

Connect the StraightShaper to power and turn it on. Verify that the POWER LED on the StraightShaper is on.

Verify that the LINK/ACT LEDs for both the WAN and LAN ports are on or blinking. (If one of the LINK/ACT LEDs stays off, use a crossed Ethernet cable on that port instead.)

Wait 2-5 minutes, while the StraightShaper auto-configures. If the STATUS LED is not blinking green after 15 minutes, you must configure the connection manually.

You are now ready to enjoy the improved Quality of Experience provided by the SmartShare StraightShaper™.

### 1.3 *Optional: Using the Web GUI to configure the connection manually*

Connect your PC to the Ext2 port on the StraightShaper, using a crossed Ethernet cable. (The red cable in the box is a crossed Ethernet cable.)

The StraightShaper will assign an IP address in the 192.0.2.0 subnet to your PC using DHCP.

If your PC does not get an IP address in this subnet, reboot your PC.

Use a web browser to access the Web GUI in the StraightShaper.

- The Web GUI address is: **`http://192.0.2.1/`**
- The default administrator user name is: **`admin`**
- Password: **`admin`**

Please note that the Ext2 port only provides access to the StraightShaper. Your PC can not access the internet through the Ext2 port.

Go to the Connection page and configure the IP address and connection speed.

Click Confirm Changes, then go to the Save page and save and activate the new configuration.

# 2. The StraightShaper WAN Optimization System

This section describes the StraightShaper WAN optimization system in details, and is written for network experts only.

### 2.1 *User Load Balancing™*

Conventional routers and switches simply forward all packets to/from users in the same order the packets are sent to/from the users, so the users with a lot of packets get a larger share of the available bandwidth than the users with fewer packets.

With User Load Balancing, packets are forwarded to/from each user in turn, so each and every user is guaranteed the largest possible share of the available bandwidth.

### 2.1.1 **User Identification**

The StraightShaper identifies individual users by their IP address presented to the LAN interface on the StraightShaper. This also means that if a group of users in an apartment shares the apartment's network connection through a NAT router in the apartment, they will be treated as one single user, because that NAT router only presents one IP address to the StraightShaper.

The StraightShaper automatically detects which IP addresses are in use, so unused IP addresses, e.g. in a structured IP address plan, do not count. In VLAN tagged networks, the StraightShaper looks at the IP addresses beyond the VLAN tag.

Advanced administrators can use the User Groups to specify which IP address ranges are managed by the StraightShaper. When specifying an address range, you have the option of choosing to identify all IP addresses from a /24 subnet as one user.

### 2.1.2 **Excess Users**

Additional IP addresses beyond the capacity of the specific StraightShaper model are considered excess users, and will be bundled together and treated as a single virtual user by the StraightShaper. This means that the excess users can access the internet, but the entire group of excess users will only get the bandwidth share of one single user.

There is no optimization within the group of excess users. A single heavy user in the group of excess users can consume all the bandwidth available for the entire group of excess users, and thus block the connection for the other excess users.

## 2.2 ***Download Optimizer™ and Upload Optimizer™***

The StraightShaper monitors the download and upload bandwidth, and while there is sufficient bandwidth and low latency, all users can use all the bandwidth they wish.
When the download bandwidth becomes scarce or delays are detected, the StraightShaper activates the Download Optimizer™.
When the upload bandwidth becomes scarce or delays are detected, the StraightShaper activates the Upload Optimizer™.

The Download and Upload Optimizers are designed to ensure that all users experience the lowest possible latency and the highest possible bandwidth. At minimum, each of N users is guaranteed 1/N of the available bandwidth.

Advanced administrators can use the User Groups to specify maximum download and upload rates per user in each group of users. Additionally, a weight per user can be specified, allowing some users to get a relatively larger share of the bandwidth.

## 2.3 ***Dynamic Quality of Service™***

The StraightShaper always prioritizes timing critical traffic flows, such as IP telephony and online gaming, over ordinary traffic flows.
The priority assignment is based on traffic pattern analysis of each flow. It is not based on the TCP/UDP port number, TOS precedence, DSCP or similar fields in the packet, because those properties can be manipulated by peer-to-peer applications or malicious users.

Dynamic QoS is an integral part of the StraightShaper bandwidth optimization system, so it does not require any configuration or allocation of bandwidth.

The StraightShaper typically recognizes and assigns high priority to a timing critical flow within one second.

### 2.4 *Extra Shaping of Users with Many Flows (Optional)*

Advanced administrators can use the User Groups to enable extra shaping of users with many flows.

When extra shaping is enabled, the bandwidth is reduced for users having more flows than allowed. The parameters are configurable.

In networks where the users have wireless access, reducing the bandwidth available to users with many flows may improve the general performance of the wireless network.

In networks where the use of peer-to-peer applications is unwanted or prohibited, a significant reduction of the bandwidth available to users with many flows may help limit the use of peer-to-peer applications.

### 2.5 *Flow Manager™*

The StraightShaper contains a table where each flow is registered while established. Each entry in the flow table contains the public IP addresses and TCP/UDP port numbers of the flow and the corresponding IP address and TCP/UDP port number of the computer on the LAN.
The StraightShaper flow table is large enough to handle the many flows that can be expected when many users are active. In addition to having a very large flow table, the Flow Manager handles excessive flows without crashing or freezing.

Just like the Download and Upload Optimizers prevent heavy users from eating up all the available internet bandwidth at the expense of other users, the StraightShaper Flow Manager prevents heavy users from eating up all the available flows in the flow table at the expense of other users.

## 3. Status page

This page shows the current status of the internet connection.

### 3.1 *System*

This shows system status, such as the name, location and contact information, current time, time zone, the duration since the last time the StraightShaper was powered on or rebooted, when the counters were last cleared, the current memory usage and the current (10 second sliding average) processor usage.

### 3.2 *System Management*

When the StraightShaper has valid IP information (either manually configured or assigned using DHCP), the IP information for in-band management is shown.
The system's permanent MAC address is shown.

### 3.3 *Health Monitor™*

This shows details about the current problems found by the Health Monitor and the total number of problems found in the past by the Health Monitor.

The Health Monitor reports if any of the following problems are present:

- The number of users exceeds the capacity of the StraightShaper model. If this happens, upgrading to a larger model is recommended.
- The connection speed is unknown, or the Bandwidth Optimizer is disabled.
- A rogue DHCP server, i.e. a DHCP server that should not be there, is detected on the network.
- A cable is not connected.
- A port is connected to equipment without Auto Negotiation. This may be OK, but usually indicates a configuration error in the other equipment.

## 3.4 *Anti Terror Logger (firmware option)*

### 3.4.1 **Log Servers**

This shows the overall status of the FTP servers where the StraightShaper stores the ATL log files. The status can be: Initializing, OK, Warning or Error.

### 3.4.2 **SNMP Agents**

This shows the overall status of the SNMP agents in the switches and routers on the local network. The status can be: Initializing, OK or Error.

### 3.4.3 **Buffer Usage**

The StraightShaper temporarily stores the ATL log files in a buffer until they are transferred to the FTP server. Buffer Usage shows the usage of this buffer.

### 3.4.4 **Flows Logged**

This shows how many flows have been logged by the StraightShaper since the last time the StraightShaper was powered on or rebooted.

## 3.5 *WAN*

This shows the status of the connection to the internet router and when the status changed, i.e. when the connection was established or lost.
The link speed and number of packets received into and transmitted out of the port is shown.

## 3.6 *LAN*

This shows the status of the connection to the local network and when the status changed, i.e. when the cable was connected or disconnected.
The link speed and number of packets received into and transmitted out of the port is shown.

## 3.7 *Ext1 (optionally Ext1 – DMZ LAN)*

Please note: Not applicable for StraightShaper 300 series.

If the Ext1/Ext2 ports have been enabled for a DMZ segment, this shows the status of the connection to the DMZ network and when the status changed, i.e. when the cable was connected or disconnected.
The link speed and number of packets received into and transmitted out of the port is shown.
Refer to "**Using the Ext1/Ext2 Ports for a DMZ**".

## 3.8 *Ext2 (optionally Ext2 – DMZ WAN)*

If the Ext1/Ext2 ports have been enabled for a DMZ segment, this shows the status of the connection to the DMZ port of the internet router and when the status changed, i.e. when the cable was connected or disconnected. (Not applicable for StraightShaper 300 Series.)
Refer to "**Using the Ext1/Ext2 Ports for a DMZ**".

The permanent IP address of the Ext2 port (for direct management) is shown.
The port's permanent MAC address, as well as the link speed and number of packets received into and transmitted out of the port is shown.

## 3.9 *Bandwidth Optimizer*

### 3.9.1 **Download and Upload Rates**

These show the current (10 second sliding average) bandwidth usage in kbit/s.

Please note: If the connection type has been set, these show the gross bandwidth usage (including framing overhead); otherwise they show the net bandwidth usage (excluding framing overhead). The same applies to the Virtual WAN interface MIB available via SNMP.

### 3.9.2 **Peak Download and Upload Rates**

These show the 1 second peak (within the last 10 seconds) bandwidth usage in kbit/s.

### 3.9.3 **Download and Upload Optimizer Status**

The StraightShaper monitors the download bandwidth, and while there is plenty of bandwidth and no delays, all users can use all the bandwidth they like. In this situation, the Download Optimizer status is shown as READY.
When the download bandwidth becomes scarce or delays are detected, the StraightShaper starts optimizing the download bandwidth to ensure the lowest possible latency and the highest possible bandwidth for each individual user. In this situation, the Download Optimizer status is shown as ACTIVE.

The StraightShaper monitors the upload bandwidth, and while there is plenty of bandwidth and no delays, all users can use all the bandwidth they like. In this situation, the Upload Optimizer status is shown as READY.
When the upload bandwidth becomes scarce or delays are detected, the StraightShaper starts optimizing the upload bandwidth to ensure the lowest possible latency and the highest possible bandwidth for each individual user. In this situation, the Upload Optimizer status is shown as ACTIVE.

### 3.9.4 **Download and Upload Available per User**

These show how much download and upload bandwidth is currently (10 second sliding average) available for any user.
The amount of bandwidth available for any user is calculated every second, and the value shown here is the average of these calculated values for the last 10 seconds.

### 3.9.5 **Active Users**

This shows how many users are currently (within the last 10 seconds) active, i.e. using bandwidth.

### 3.9.6 **Download and Upload Optimizer Active Time**

These show how many seconds the Download and Upload Optimizers have been active.

### 3.9.7 **Downloaded and Uploaded**

These show the total number of bytes transferred in each direction.

Please note: If the connection type has been set, these include the calculated framing overhead. The same applies to the Virtual WAN interface MIB available via SNMP.

## 3.10 ***Flow Manager***

### 3.10.1 **Flows**

When analyzing the utilization of the internet connection, it is not only interesting to know the bandwidth usage, but also how many concurrent flows are established. Flows are sometimes called sessions or connections. A high number of concurrent flows means that the computers on the local net are connected to many servers on the internet, but it does not necessarily mean that packets are flowing and bandwidth is being used.

### 3.10.2 **Flow Rate**

This shows the rate of new flows established per second.

### 3.10.3 **Flows Processed**

This shows the total number of flows processed, including currently established flows.

### 3.11 *User Manager*

#### 3.11.1 **User Capacity**

This shows how many users the StraightShaper is licensed to manage. Refer to "**User Identification**".

If the number of users exceeds this number, the Quality of Experience for some users will be severely degraded, and the StraightShaper should be upgraded to a larger model.

#### 3.11.2 **Managed Users**

This shows how many users are managed by the StraightShaper.

#### 3.11.3 **Normal Users**

This shows how many of the managed users have a long duration of activity, and are normally being managed by the StraightShaper.

#### 3.11.4 **Aging Users**

This shows how many of the managed users have been idle for more than eight hours. The User Manager may discard statistical information about aging users to make room for new users.

#### 3.11.5 **New Users**

This shows how many new users have been detected as candidates for being managed by the StraightShaper. New users have only transmitted but not received traffic.

#### 3.11.6 **Peak Users**

This shows how many users have been active.

If this number exceeds the capacity of the StraightShaper, the Quality of Experience for some users will be severely degraded, and the StraightShaper should be upgraded to a larger model.

#### 3.11.7 **Required Minimum User Capacity**

This shows how many users have been active, taking into account that statistical information about aging users can be discarded to make room for new users.

In other words, this shows the absolute minimum user capacity required to manage the users, when discarding statistical information about the individual users is acceptable.

If this number exceeds the capacity of the StraightShaper, the Quality of Experience for some users will be severely degraded, and the StraightShaper should be upgraded to a larger model.

## 4. Connection configuration page

The StraightShaper can be accessed via its IP address, which is configured here.

### 4.1 *IP Address*

The connection can be configured for 2 different IP address types:

- DHCP Assigned
- Static Configuration

The default configuration is: DHCP Assigned

#### 4.1.1 **DHCP Assigned**

This type of connection is fully automatic. If the DHCP Server requires a hostname in the DHCP request, it can be set here.

#### 4.1.2 **Static Configuration**

The following information is required:

- IP Address
- Subnet Mask
- Default Gateway (Router)
- Primary DNS Server

The following information is optional:

- Secondary DNS Server

### 4.2 ***Management VLAN (optional)***

The StraightShaper can be installed on a VLAN trunk connection without requiring any VLAN configuration. When optimizing the traffic passing through, it simply looks at the IP addresses beyond the VLAN tags.

However, if the management network is VLAN tagged, the IP address used for in-band management of the StraightShaper must also be VLAN tagged, the VLAN ID of the management VLAN must be set.

### 4.3 ***Connection Speed***

The connection speed must be set correctly, or the Quality of Experience for the users will be degraded. For the best results, use the built-in connection speed test.

If the connection speed advertised by the internet service provider (ISP) contains two numbers, for example 1024/256; the download speed is normally the larger of the numbers and the upload speed is the lesser.
Please note that an advertised speed of 1 M usually means 1024 and 2 M usually means 2048, but 10 M usually means 10000 and 100 M always means 100000.

Many ISPs advertise the raw connection speed, which does not account for framing overhead, so the users will experience speeds slightly below the advertised speed. This is normal.
The amount of framing overhead depends on the connection type. In the worst case, a DSL connection has 165% overhead on small TCP ACK packets, because it requires 2 ATM cells of 53 bytes to carry a TCP ACK packet of only 40 bytes.
The StraightShaper compensates for framing overhead if the connection type has been set (or measured by the automatic test).

#### 4.3.1 **Automatic Test**

If Connection Speed is set to Automatic Test, the StraightShaper automatically tests the connection speed when powered on, and sets the connection speed and type accordingly.

Click the Test Now button to start a new connection speed test. Please note that normal user traffic is temporarily blocked while the StraightShaper is testing the connection speed.

#### 4.3.2 **Static Configuration**

The following information is required:

- Download Rate in kbit/s
- Upload Rate in kbit/s
- Connection Type

The WAN optimization can be disabled by leaving the Download and Upload Rate fields empty.

Click the Test Now button in the Automatic Test area to start the built-in connection speed test. Please note that normal user traffic is temporarily blocked while the StraightShaper is testing the connection speed.

### 4.4 *Network Name*

The hostname must be set. Optionally a domain name can be set.

The default hostname is: straightshaper
The default domain name is: local

## 5. ATL (Anti Terror Logging) configuration page (firmware option)

Please note: The ATL firmware option includes separate log file analysis tools for Linux and Windows and the UM0005 Anti Terror Logging User Manual with detailed descriptions of how to use the ATL feature.

### 5.1 *Log File Storage*

The StraightShaper stores the ATL log files on an external FTP server.

If ATL is enabled, it is possible to configure up to two FTP servers for storing the ATL log files. When the StraightShaper is ready to store an ATL log file, it will use the primary FTP server. Every time the primary FTP server fails to receive an ATL log file, the StraightShaper will store it on the secondary FTP server instead.

FTP Server, User Name and Password are required fields; Directory Path is optional.
The Status field shows the result of the last FTP transfer.

### 5.2 *Local Network SNMP Agents*

The StraightShaper uses the SNMP agents in the switches and routers on the local network to locate where each MAC address and IP address is connected, and thus identifies the users.

If ATL is enabled, it is possible to configure which SNMP agents are present on the local network. Information about each switch and router on the LAN should be set, so the StraightShaper is able to poll them for the required information to identify the users.

IP Address and Community are required fields. The Status field shows the result of the last SNMP poll of the device.

#### 5.2.1 **ATL Compatibility Requirements for the Local Network Equipment**

The local network equipment must support specific SNMP features in order to be ATL compatible.
Layer 2 switches used in the network must support all of the following features:

- SNMP v2c (RFC3416 or RFC1905) or SNMP v1 (RFC1157)
- dot1dTpFdbTable of the Bridge MIB (RFC4188 or RFC1493)
- dot1dBasePortTable of the Bridge MIB (RFC4188 or RFC1493)
- ifTable of the Interfaces MIB (RFC2863, RFC2233, RFC1573 or RFC1213)

They may additionally support the following features, but it is not required:

- ifXTable of the Interfaces MIB (RFC2863, RFC2233 or RFC1573)

Layer 3 routers used in the network must additionally support all of the following features:

- ipNetToMediaTable of the Internet Protocol MIB (RFC4293, RFC2011 or RFC1213)

## 6. Advanced configuration page

### 6.1 *Remote Management*

The built-in Web GUI can be changed to a different port.
The built-in SNMP agent can be changed to a different port.

The default Web GUI port is: 80
The default SNMP agent port is: 161

## 6.2 *Special Features*

### 6.2.1 **VoIP Extra Priority**

Enabling VoIP Extra Priority has the following effects:

- VoIP will always have highest priority, even if it takes excessive bandwidth from the other users.

When using IP telephony through the WAN connection, enabling VoIP Extra Priority is recommended.

The default setting for VoIP Extra Priority is: Disabled

## 6.3 *System Time*

### 6.3.1 **Time Zone**

The StraightShaper can show the time according to the local time zone and automatically adjust for Daylight Saving Time.

The default time zone is: UTC

### 6.3.2 **Preferred NTP Server**

The system time should be synchronized with an external NTP server, so the time is always correct. If the preferred NTP server is not set, the StraightShaper will use the NTP server assigned by DHCP (if available, and if using a DHCP assigned IP address).

The default configuration is: ntp.smartsharesystems.com

## 6.4 *Provisioning*

The StraightShaper can periodically report statistical usage information to a central provisioning server. For further information, refer to "Usage Information sent to SmartShare Systems".

If the WAN/internet connection is charged for traffic (i.e. it is not a flat rate subscription), this should be disabled. (Not applicable for Trial models.)

The default configuration is: Automatic

## 6.5 *Remote Logging*

All system events are logged in the system log, which is shown on the Log page. Additionally, they can be sent directly to a SYSLOG server or an email address.

### 6.5.1 **SYSLOG**

If you have a SYSLOG server, you can set these fields, and the StraightShaper will send the events to your SYSLOG server too. Two independent SYSLOG servers can be set.

### 6.5.2 **Email**

If you want the events sent to your email address, the following fields must be set:

- To Email Address. Your email address, e.g. bob@example.com.
- From Email Address. The email address you want the StraightShaper to insert as sender, e.g. smartshare@example.com.
- SMTP Server. Either your own SMTP server, which can receive emails to your email address, or the ISP's SMTP server, which can forward emails from the StraightShaper.

## 6.6 *System Information*

System contact and location can be set. This is not used by the system itself. It is shown on the status web page, is available via SNMP, and is included in event log emails sent by the StraightShaper.

### 6.7 *Extension Ports*

Please note: Not applicable for StraightShaper 300 series.

If the StraightShaper is installed in a network with a DMZ, the Ext1/Ext2 ports must be enabled for this purpose.

Refer to "**Using the Ext1/Ext2 Ports for a DMZ**".

### 6.8 *Fallback for Equipment without Auto Negotiation*

The Ethernet standard (IEEE 802.3) uses a protocol called Auto Negotiation to ensure that network ports automatically use the correct speed and duplex when the network cable is plugged in. Some old network equipment does not support this protocol.

If the StraightShaper is connected to a network port without Auto Negotiation, it can sense the speed (10 or 100 Mbit/s), but the duplex must be set.

### 6.9 *DHCP Server Detector*

The StraightShaper can detect rogue DHCP servers on the local network. If the IP address and/or MAC address of the authorized DHCP servers are entered, no false warnings are shown when these are detected.

### 6.10 *Extra Shaping of Users with Many Flows*

Extra Shaping can be used to reduce the bandwidth for users with many flows. Extra Shaping can be enabled per User Group. Refer to "***User Groups***".

In networks where the users have wireless access, reducing the bandwidth available to users with many flows may improve the general performance of the wireless network.

In networks where the use of peer-to-peer applications is unwanted or prohibited, a significant reduction of the bandwidth available to users with many flows may help limit the popularity of peer-to-peer applications.

The following can be set for the extra shaper:

- Threshold Flows. Each user is allowed to have this many concurrent flows.
- Threshold Duration. A user may exceed the allowed number of concurrent flows for this duration without being restricted by the extra shaper.
- Maximum Download and Upload Rates. The maximum bandwidth allowed for each user being restricted by the extra shaper.
- Release Delay. When a user is restricted by the extra shaper, and has not exceeded the allowed number of concurrent flows for this duration, the user is released from extra shaping.

### 6.11 *User Groups*

User Groups can be used to configure specific IP address ranges to be managed differently by the StraightShaper. Maximum download and upload rates per user, the weight per user, and extra shaping of users with many flows can be set for each user group. A user group can also be set to have no WAN access, or set to be considered excess users.

The following can be set for each user group:

- IP address range defining the group.
- Group Type. Choose "One IP Address per User" for normal user identification, where each IP address identifies one user. Choose "One /24 Subnet per User" if you want all IP addresses within a /24 subnet to be identified as one single user. This can be used in routed networks, where each apartment (or office) is assigned a /24 subnet. Choose "Excess Users" for users that are considered excess. Choose "No Access to WAN" for users that should be denied access to

the WAN. Attempts by those users to connect to the WAN will be rejected by the StraightShaper.
- Maximum Download and Upload Rate per User (optional). This can be used to set the maximum bandwidth allowed for each user in the user group. If left blank, there will be no specific bandwidth limits; the users will participate normally in the management of all the available bandwidth.
- Weight per User (optional). This can be used to give users in the user group a larger share of the bandwidth than other users. E.g. users with a weight of 3 get three shares of the bandwidth each time another user gets one share of the bandwidth.
- Extra Shaping. This can be used to enable extra shaping of users (in the user group) with many flows. Refer to "***Extra Shaping of Users with Many Flows***".
- Description. This can be used to store an informative description of the user group.

The default configuration is: Disabled

### 6.12 *Network Topology*

Normally, entering the network topology is not required, but in a complex network configuration, the user experience may be improved if the network topology is entered.

Traffic flowing into the WAN port is per default considered coming from a remote location, and traffic flowing into the LAN port is per default considered going to a remote location. Exceptions are entered here.

The most common exception is the internet router. If a local user manages the internet router, the StraightShaper sees traffic flowing through, and it can not determine that the traffic stops at the router and thus doesn't use any of the connection's bandwidth. By entering the internet router's IP address as a local location, the StraightShaper will exclude this traffic when determining the connection's bandwidth. Likewise, if a local web server is addressed by the internet router's public IP address, this address should be entered as local.

When a StraightShaper 1000 Series is used in a network with a DMZ, enter the LAN IP address range as local and the DMZ IP address range as local. Refer to "**Using the Ext1/Ext2 Ports for a DMZ**" for further details.

## 7. Detailed Status page

This shows the list of managed users and their individual status. The list can be downloaded as a text file to the PC.

The following information about each user is shown:
- IP Address.
- Status: The management status of the user.
- Download Rate: The current (10 second sliding average) download rate in kbit/s.
- Upload Rate: The current (10 second sliding average) upload rate in kbit/s.
- Flows: Number of concurrent flows.
- Peak Flows: Peak number of concurrent flows.
- Flow Rate: Rate of new flows established per second.
- Downloaded: The total number of bytes downloaded.
- Uploaded: The total number of bytes uploaded.
- Flows Processed: The total number of flows processed, including currently established flows.

Please note: If the connection type is set, the download and upload rates and the bytes downloaded and uploaded show the gross values (including framing overhead); otherwise they show the net values (excluding framing overhead).

# 8. Charts page

This shows the following live charts:

- User Bandwidth Overview: Bandwidth available per user.
- Connection Bandwidth Overview: Bandwidth usage and status of the Download and Upload Optimizers.
- Flows Overview: Concurrent flows and flow rate.
- User Overview: Number of managed and active users.

The visible duration and the sampling interval are shown below the X axis. E.g. "5 minutes in 1 second intervals" means that the chart shows 5 minutes worth of samples, where each sample is measured in an interval of 1 second.

The most recent and the average value of the visible duration are shown below each legend. The value in parentheses is the average value of the visible duration.

High resolution data (1 second sampling interval) are available for the last 5 minutes; low resolution data (1 day sampling interval) are available for the last year. The resolutions in between vary according to the sampling period.

Please note: The web browser must support Java™ Standard Edition version 1.3.1 or later.

## 8.1 *Manipulating the Charts*

Use the following actions to manipulate the charts:

- Drag the chart area right or left to show older or newer data. When looking at older data, the chart stops automatically scrolling when new data are sampled.
- Drag the chart area all the way to the left to make it continuously scroll when new data are sampled.
- Left click inside the chart area to zoom in (i.e. change to a shorter sampling interval) around the point clicked.
- Right click inside the chart area to zoom out (i.e. change to a longer sampling interval) around the point clicked.
- Click the arrow on any Y axis to lock or unlock the Y axis range. When locked, the arrow is colored red.
- Click any legend to hide or show its values on the graph. When hidden, the legend is grayed out.

## 8.2 *User Bandwidth Overview*

This shows the following:

- Average Download Available per User: How much download bandwidth was available for any user in the sampling interval.
- Minimum Download Available per User: What was the minimum download bandwidth available for any user in the sampling interval.
- Average Upload Available per User: How much upload bandwidth was available for any user in the sampling interval.
- Minimum Upload Available per User: What was the minimum upload bandwidth available for any user in the sampling interval.

Please note: If the connection type is set, the download and upload rates show the gross values (including framing overhead); otherwise they show the net values (excluding framing overhead).

## 8.3 *Connection Bandwidth Overview*

This shows the following:

- Average Download Rate: The average download rate in the sampling interval.
- Peak Download Rate: The (1 second) peak download rate in the sampling interval.
- Average Upload Rate: The average upload rate in the sampling interval.

- Peak Upload Rate: The (1 second) peak upload rate in the sampling interval.
- Download Optimizer Active: How often was the Download Optimizer active during the sampling interval.
- Upload Optimizer Active: How often was the Upload Optimizer active during the sampling interval.

Please note: If the connection type is set, the download and upload rates show the gross values (including framing overhead); otherwise they show the net values (excluding framing overhead).

### 8.4 *Flows Overview*

This shows the following:

- Flows: Average number of concurrent flows in the sampling interval.
- Flow Rate: Average rate of new flows established per second in the sampling interval.

### 8.5 *User Overview*

This shows the following:

- Managed Users: Number of users managed by the StraightShaper in the sampling interval.
- Active Users: Number of users active, i.e. using bandwidth, in the sampling interval.

Please note: It is a natural phenomenon that the number of active users grows when the sampling interval grows. E.g. in a network with 10 users, it is likely that very few use bandwidth in one particular second, while it is likely that many use bandwidth throughout one entire day.

## 9. Top Users page

This shows live pie charts of the currently most active users by different criteria:

- Current (10 second sliding average) bandwidth usage.
- Concurrent flows.
- Current (10 second sliding average) download rate.
- Current (10 second sliding average) upload rate.

Each pie chart shows a slice for each of the top 10 users, a slice for the sum of other users and a slice for the unused capacity. The charts automatically update every 5 seconds.

Please note: If the connection type is set, the bandwidth usage and download and upload rates show the gross values (including framing overhead); otherwise they show the net values (excluding framing overhead).

Please note: The web browser must support Java™ Standard Edition version 1.3.1 or later.

### 9.1 *Manipulating the Pie Charts*

Use the following actions to manipulate the pie charts:

- Click the Unused legend to exclude or include it in the data shown by the pie chart. When excluded, the legend is grayed out.

## 10. Log page

This shows the list of system events and time of occurrence. The list can be downloaded as a text file to the PC.

## 11. Save page

### 11.1 *Saved, Running and New Configuration*

The configuration stored in the built-in flash memory, and loaded at power-on (or reboot), is called the "Saved configuration".

The current configuration of the StraightShaper is called the "Running configuration".

The configuration being built up using the Web GUI is called the "New configuration" until it is activated. (Then it becomes the Running configuration.)

### 11.2 *Modifying the Configuration*

Depending on configuration changes made, the Save page provides the following choices:

- Activate New Configuration: Replaces the Running configuration with the New configuration, i.e. effectuates the configuration changes immediately.
- Activate and Save New Configuration: Replaces both the Running configuration and the Saved configuration with the New configuration, i.e. effectuates the configuration changes immediately and saves the configuration to the flash memory, so it will be loaded every time the StraightShaper is powered on (or rebooted).
- Save New Configuration and Reboot: Replaces the Saved configuration with the New configuration and reboots, i.e. saves the configuration changes to the built-in flash memory, so it will be loaded every time the StraightShaper is powered on (or rebooted) and then reboots.
- Revert to Running Configuration: Replaces the New configuration with the Running configuration, i.e. discards the configuration changes.
- Save Running Configuration: Replaces the Saved configuration with the Running configuration, i.e. saves the current configuration to the built-in flash memory, so it will be loaded every time the StraightShaper is powered on (or rebooted)

The following configuration changes require a reboot of the StraightShaper:

- Any modification of Management VLAN ID.

Please note: To restore the factory default configuration, go to the **System** page.

## 12. System page

### 12.1 *Download Firmware*

The StraightShaper firmware can be upgraded from the firmware server at SmartShare Systems or any other firmware server. Firmware upgrade is a two step process. First, enter the URL of the firmware to be downloaded, and click the Download Firmware button. Second, when the firmware has been downloaded, checked for validity and is ready for installation, you can choose to cancel the upgrade or to proceed with the installation of the downloaded firmware.

### 12.2 *Install Activation Code*

Features and capacity of the StraightShaper can be changed by installing different activation codes. Enter the activation code and click the Install Activation Code button. After the activation code has been validated, the StraightShaper must be rebooted to activate the new feature set.

### 12.3 *Trial Mode*

If a trial license is installed, the StraightShaper can operate in a trial mode where the model type and optional features can be changed. This can be used for evaluation purposes.

An ongoing trial can be stopped at any time, and the StraightShaper will revert to normal operation.

The trial time stop watch only runs while the StraightShaper operates in a trial mode.

As long as trial time remains, new trials can be started.

When the trial expires, the StraightShaper will reboot and revert to normal operation.
The available trial time is controlled by the installed license, and additional trial time can be installed with additional activation codes.

12.4 ***Set System Date and Time***

Enter the Date and Time and click the Set Date and Time button to set the system clock.

12.5 ***Download Configuration to PC***

The running configuration can be downloaded to a file on your PC.

The downloaded configuration file can be restored to the StraightShaper later, or even installed on another StraightShaper.

12.6 ***Upload Configuration from PC***

You can prepare a new configuration for the StraightShaper by uploading a previously downloaded configuration file from your PC.

When the new configuration has been uploaded, you can modify it in the Web GUI before you go to the **Save** page to activate it.

12.7 ***Restore Factory Defaults***

Click this button if you wish to restore the factory default configuration.

12.8 ***Reboot System***

Click this button if you wish to reboot the StraightShaper. Rebooting the system does not clear the configuration.

## 13. Managers configuration page

Multiple users can manage and configure the StraightShaper.

The following can be set for each manager:

- User Name (required).
- Password. Password for access to the Web GUI.
- Community. SNMP Community for access to the SNMP agent. If not set, access to the SNMP agent will not be allowed.
- Allow from First and Last IP Address (optional). If set, the manager is only allowed management access if he connects from a PC within the specified IP address range.
- Manager Level. This determines how much the manager has access to do.

The following Manager Levels are available:

- Blocked. No access.
- User. Access to the Status page only.
- Installer. Full access.

The factory default administrator user name is: **`admin`** and password: **`admin`**
The factory default community is: (empty)

## 14. Logout page

Log out and return to the login page.

## 15. Using the Serial Port

The serial port can be used with any terminal emulator, such as Hyperterm or Tera Term Pro, as a fallback solution if the LAN connection has been lost.
The speed is: 115200 8N1 (115200 baud, 8 bits, No parity, 1 stop bit).

The following commands are available:

- ? – Show help.
- info – Show configuration information.

- stop trial – Stop the ongoing trial.
- reboot – Reboot the StraightShaper.
- restore – Restore configuration to factory default.
- license – Show hardware MAC and license ID.
- activation=xxxxx – Install activation code.
- password bypass – Enable factory default administrator user name: **admin** and password: **admin** for 5 minutes.

The serial port is not password protected.

## 16. Using the Ext2 Port for Management

The Ext2 port can be used for accessing the Web GUI. It contains a DHCP server, so a PC can be easily connected.

Use a web browser on a PC connected via a crossed Ethernet cable to the Ext2 port to access the Web GUI in the StraightShaper.
The Web GUI address is: **http://192.0.2.1/**
The default administrator user name is: **admin** and password: **admin**

Please note: No traffic is routed to/from the Ext2 port, so the PC must be connected directly to the Ext2 port, using a crossed Ethernet cable or via a switch.

## 17. Using the Ext1/Ext2 Ports for a DMZ Segment

Please note: Not applicable for StraightShaper 300 series.

In networks with a DMZ, the StraightShaper must be connected to the internet router and the LAN and DMZ switches as follows:

- Connect the LAN port to the LAN switch's uplink port and the WAN port to the internet router's LAN port. (This is similar to not using a DMZ.)
- Connect the Ext1 port to the DMZ switch's uplink port and the Ext2 port to the internet router's DMZ port.
- In the Advanced page, enable Ext1/Ext2 Ports for DMZ Segment.
- In the Advanced page's Network Topology box, enter the IP address ranges used in the LAN and DMZ Segments as local. (Traffic between the LAN and the DMZ segment flows via the internet router. Setting the network topology tells the StraightShaper that this traffic does not affect the internet connection's bandwidth.)

Please note: If the network uses a separate DMZ port on the internet router, and the StraightShaper is only connected between the internet router's LAN port and the LAN switch's uplink port, traffic to/from the DMZ is not included when managing the bandwidth of the internet connection. This means that DMZ traffic can disturb the LAN traffic, so the bandwidth is not managed correctly.

## 18. Security Considerations

### 18.1 *Physical Access*

The StraightShaper should be installed in a locked patch panel. Anyone with physical access to the StraightShaper can power it off, disconnect it or change the configuration via the Serial and Ext2 ports.

### 18.2 *Password Protection*

The StraightShaper Web GUI is password protected. Keep your password safe.

The StraightShaper is delivered with a default password, which is very common and easy to guess. The password should be changed during installation.

### 18.3 *SNMP Community*

Access to the StraightShaper SNMP agent is protected by a "community", which is the SNMP equivalent of a password.

The StraightShaper is delivered with a default SNMP community, which is very common and easy to guess. The SNMP community should be changed during installation.

### 18.4 *Protecting Local Users from Each Other*

When installing and configuring the local network infrastructure, i.e. switches and wireless access points, it should be considered if the local network should be open (where all local users can connect to each other and share files etc.) or protected (where all local users are separated from each other, and each user only has access to the internet and local servers).
User separation has different names, depending on equipment and vendor. In switches, look for "source-port filters" (HP ProCurve terminology), "Private VLANs" (Cisco terminology) or similar. In wireless access points, look for "AP isolation", "client isolation" or similar.
User separation does not affect the StraightShaper, and the StraightShaper works equally well with both open and protected networks.

## 19. Usage Information sent to SmartShare Systems

When provisioning is set to Automatic, statistical usage information is periodically reported to a central provisioning server hosted by SmartShare Systems.

Please note that provisioning can not be disabled in Trial mode.

### 19.1 *Bandwidth Usage*

The central provisioning server is contacted approximately once per hour, and ca. 100 KB is transferred each time.

### 19.2 *Information Sent*

The information sent identifies the StraightShaper and contains statistical data about its environment and utilization.

The following information is sent:

- Product identification: Hardware ID (MAC Address), License ID, Product model, Firmware version.
- Trial information (Trial models only): Trial model, Remaining trial time.
- General system information: Uptime, Time, Time Zone.
- System performance statistics: Memory and Processor usage.
- Feature usage information: Which configuration parameters are changed (the values are not sent; only whether each parameter has its default value or not).
- Connection Speed and Speed Test information: Download and Upload Speed, Connection Type, Test Server used, Server Location, Round Trip Time, Confidence.
- Connection usage statistics: Number of Downloaded and Uploaded bytes, Number of Flows Processed.
- Optimization and Health statistics: Download and Upload Optimizer Active Time, Extra Shaper Active Time, Number of Current and Past Problems detected by the Health Monitor.
- User activity and experience statistics: Number of Active Users, Active User Time (measured in user seconds), Average and Minimum Download and Upload Bandwidth Available per User, User Experience Improved Time (measured in user seconds).
- User Manager statistics: User Capacity, Number of Managed Users, Number of New and Aging Users, Peak Number of Users, Required Minimum User Capacity.

### 19.3 *Privacy Considerations*

The information sent identifies the specific StraightShaper by its unique Hardware ID, so the information can be analyzed in a historical perspective.

The information sent does not identify individual users, and it does not contain any information about individual users.

## 20. Troubleshooting and FAQ

Q: How to verify that the StraightShaper is active.
A: Test the Download Optimizer by downloading from a very fast server on the internet from two PCs simultaneously. Go to the **Status** page and check that the Download Optimizer status changes from READY to ACTIVE while the download connection is saturated.
Test the Upload Optimizer by uploading to a very fast server on the internet from two PCs simultaneously, while monitoring the Upload Optimizer status.

Q: The StraightShaper does not have any effect on the user experience.
A: Verify that the StraightShaper is installed correctly, especially that the connection speed is configured according to the actual connection bandwidth.

Q: The administrator password for the StraightShaper is lost.
A: Use the Ext2 port to change the password. Refer to "Using the Ext2 Port for Management". Alternatively, use the Serial port to enable the default username and password for 5 minutes, then login via the Web GUI and set a new password. Refer to "Using the Serial Port".

Q: The StraightShaper can not be accessed any more.
A: Use the Serial port to restore the factory default settings. Refer to "Using the Serial Port".

Q: Some of the computers on the local network can not access the internet.
A: If a device with a DHCP server is wrongly connected to the LAN, the computers on the LAN may get an incorrect configuration from the unauthorized DHCP server. Most routers and wireless access points have a DHCP server on their LAN ports. Use the Rogue DHCP Server Detector to determine if any rogue DHCP servers are connected to the LAN. Locate the device and disconnect it from the LAN.

## 21. LED Indicators

The two LEDs for each **LAN**/**WAN**/**Ext1**/**Ext2** Ethernet port indicate as follows:

| | |
|---|---|
| LINK/ACT = Off | No connection. |
| LINK/ACT = On, 10/100 = Off | 10 Mbit/s link to other device established. |
| LINK/ACT = On, 10/100 = On | 100 Mbit/s link to other device established. |
| LINK/ACT = Blink | Link is active with transmissions. |

The **POWER** LED indicates as follows:

| | |
|---|---|
| POWER = Off | Power is off. |
| POWER = On | Power is on. |

The **STATUS** LED indicates as follows:

| | |
|---|---|
| STATUS = Green Light | The StraightShaper is booting. |
| STATUS = Green Blink Slow | Connection is established.<br>Download and Upload Optimizers are ready. |
| STATUS = Green Blink Fast | Connection is established.<br>Download and/or Upload Optimizer is active. |
| STATUS = Red Blink Slow | Bandwidth Optimizer is disabled, or connection is broken or not established yet. |
| STATUS = Red Blink Fast | Error requiring manual intervention. |
| STATUS = Red and Green | Defect requiring factory repair. |

## 22. Power Consumption

| | 300 Series | 1000 Series | 5000 Series |
|---|---|---|---|

| | | | |
|---|---|---|---|
| Typical | 12 Watt | 24 Watt | 24 Watt |
| Maximum | 15 Watt | 35 Watt | 35 Watt |
| Typical annual power consumption | 105 kWh | 210 kWh | 210 kWh |

The table above shows the power consumption at the primary side of the power supply, i.e. at the 110-240V plug. The annual cost of electricity for the StraightShaper can be estimated by multiplying the price of electricity (per kWh) with the typical annual power consumption of the installed StraightShaper.

## 23. Environmental Requirements

| | |
|---|---|
| Power | 100 – 240 V, 50 – 60 Hz |
| Temperature | 0 – 40 °C |
| Humidity | 5 – 95 %RH, non-condensing |

## 24. Compliance Statement

The product complies with directive 2006/95/EC (LVD) and 2004/108/EC (EMC).

The product complies with the following requirements:

| | |
|---|---|
| Electrical Safety | UL 60950<br>CSA 60950<br>EN 60950<br>IEC 60950 |
| EMC Emission | FCC Part 15, Subpart B Class A<br>IC ICES-003 Class A<br>EN 55022 Class A<br>CISPR 22 Class A |
| EMC Susceptibility | EN 55024<br>CISPR 24 |
| CE Mark | Yes |

### 24.1 ***Model Type Labels***

300 Series products are labeled model DT.
1000 Series, 2000 Series, 3000 Series and 5000 Series products are labeled model RM.

## 25. Glossary

| | |
|---|---|
| ATL | Anti Terror Logger (or Anti Terror Logging) |
| DHCP | Dynamic Host Configuration Protocol |
| DNS | Domain Name System |
| DQoS™ | Dynamic Quality of Service™ |
| DSCP | Differentiated Services Code Point |
| FTP | File Transfer Protocol |
| GUI | Graphical User Interface |
| IP | Internet Protocol |
| ISP | Internet Service Provider |
| LAN | Local Area Network |
| LED | Light Emitting Diode |
| MIB | Management Information Base |
| MTU | Maximum Transmission Unit |
| NAT | Network Address Translation |
| NAPT | Network Address and Port Translation |
| NTP | Network Time Protocol |
| QoE | Quality of Experience |
| QoS | Quality of Service |
| SMTP | Simple Mail Transfer Protocol |

| | |
|---|---|
| SNMP | Simple Network Management Protocol |
| SPI | Stateful Packet Inspection |
| TOS | Type Of Service |
| ULB™ | User Load Balancing™ |
| VoIP | Voice over IP |
| WAN | Wide Area Network |

## 26. Licensing Information

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This EULA is effective until terminated. Customer may terminate this EULA at any time by returning the Equipment, and destroying all copies of Software including any documentation. This EULA will terminate immediately without notice from SmartShare Systems if Customer fails to comply with any provision of this EULA. Upon termination, Customer must destroy all copies of the Software.

**Choice of law**

This EULA as well as the rights and obligations of SmartShare Systems and Customer herein shall be construed in accordance with and be governed by the laws of Denmark, not including Danish international private law rules which point to a choice of law other than Danish law. If a dispute is not resolved by prior negotiation between SmartShare Systems and Customer, either party may, upon notice, submit any dispute to resolution by the relevant city court at SmartShare System's venue (in Danish: "SmartShare Systems' hjemting"), whether proceedings are commenced by Customer or SmartShare Systems. If any portion of this EULA is found to be void or unenforceable, the remaining provisions of this EULA shall remain in full force and effect.

**Entire agreement**

This EULA constitutes the entire EULA between the parties with respect to the use of the Software.

### 26.2 *Third Party Software Components*

The third party software components that may be included in the Software are individually licensed according to the following license agreements:

- GNU General Public License v. 2.0
- GNU Library GPL version 2.0
- GNU Lesser GPL version 2.1
- COPYING file dated 2004 for lighttpd (revised BSD license)
- PHP License version 3.01
- Zend Engine License version 2.00

The content of these individual licenses can be found at SmartShare Systems' website (http://smartsharesystems.com/en/support/licenses).

#### 26.2.1 **Acknowledgements for third party software components**

The following acknowledgements pertain to third party software components that may be included in the Software:
*"This product includes PHP software, freely available from <http://www.php.net/software/>"*

*"This product includes the Zend Engine, freely available at http://www.zend.com"*

#### 26.2.2 **Open Source Software Components**

The Software may contain Open Source Software Components, i.e. software components licensed with the requirement that its source code can be obtained from the distributor of the software component.

The source code for Open Source Software Components that may be included in the Software can be obtained directly from SmartShare Systems (http://smartsharesystems.com/en/support/licenses).

Please note that only the source code for the Open Source Software Components is provided. Although all SmartShare Systems' modifications of the Open Source Software Components are included in the source code, as required by their respective licenses, the Open Source Software Components are only a small part of the Software.

## 27. Safety Instructions

The StraightShaper is intended for use in a computer network to improve the overall network performance for the users of the network.

In case your product is equipped with a detachable power cord, beware of the following:

- For 1000 and 5000 Series models:
  Do not attempt to modify or use a supplied AC power cord if it is not the exact type required. If a power cord supplied with the device is not compatible with the AC wall outlet in your region, get one that meets the following criteria. The cord must be rated for the available AC voltage and have a current rating that is at least 125% of the current rating of the device. The connector that plugs into the wall outlet must be a grounding-type male plug designed for your region. It must have the certification marks showing certification by an agency acceptable in your region. The connector that plugs into the AC receptacle on the device must be an IEC 60320 C13, type female connector.
- For 300 Series models:
  Do not attempt to modify or use a supplied AC power cord if it is not the exact type required. If a power cord supplied with the device is not compatible with the AC wall outlet in your region, get one that meets the following criteria. The cord must be rated for the available AC voltage and have a current rating that is at least 125% of the current rating of the device. The connector that plugs into the wall outlet must be a male plug designed for your region. It must have the certification marks showing certification by an agency acceptable in your region. The connector that plugs into the AC receptacle on the device must be an IEC 60320 C6/C8, type female connector.

## 27.1 ***Warning***

This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

The user is cautioned that changes and modifications made to the equipment without approval of the manufacturer could void the user's authority to operate the equipment.

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

## 27.2 ***Product Disposal***

Electrical and electronic products, accessories and batteries should not be disposed of with normal household waste. Please consult your local municipality or your national SmartShare Systems distributor for advice on how to dispose of these items.